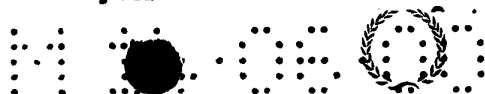




PCT/EP 00/03713



INVESTOR IN PEOPLE

09/926310

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

REC'D 28 JUN 2000

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PCT

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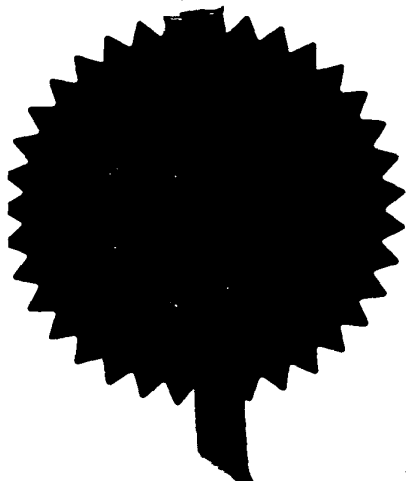
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Signed

*Andrew Gersey*

Dated 20 April 2000



00-20-01 H

Act 1977

The  
Patent  
Office



0 00 0.00 9912565.0

**Request for the grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

28 MAY 1999

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference

HMJ03214GB

2. Patent application number

(The Patent Office will fill in this part)

**9912565.0**

3. Full name, address and postcode of the or of each applicant (underline all surnames)

RASMUSSEN, Ole-Bendt  
Sagenstrasse 12  
CH 6318 Walchwil  
SWITZERLAND

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

6056337003

4. Title of the invention

Manufacturing a food product by coextrusion

5. Name of your agent (if you have one)

GILL JENNINGS & EVERY

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Broadgate House  
7 Eldon Street  
London  
EC2M 7LH

Patents ADP number (if you know it)

745002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

- a) any applicant named in part 3 is not an inventor
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form

Description	5
Claim(s)	2
Abstract	0
Drawing(s)	0



10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents  
(please specify)

11. For the Applicant  
Gill Jennings & Every

I/We request the grant of a patent on the basis of this application.

Signature

Date



28 May 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

HUCKER, Charlotte Jane  
0171 377 1377

#### Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

#### Notes

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- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
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Manufacturing a food product by coextrusion.

The invention concerns a method of manufacturing by coextrusion food product in sheet, ribbon or filament form, which product consists of at least two components A and B each as layers or lamellae, A being in a softer and B in a firmer state, these states referring to 20 degr. C whereby B is sandwiched between layers of A. ✓

The inventor's two (expired) U.S. patents No. 4.115.502 and 4.436.568 disclose such products. The former discloses:

- a) strands of a viscous sugar solution, interspersed with strands of dough. The coextruded sheet formed product is subsequently baked - and:
- b) strands of highly viscous, dissolved or swollen protein and of a viscous sugar solution, caramel and/or dough; the coextruded sheet formed product is subsequently solidified. (See col. 6 line 65 to col. 7 line 5 of this patent).

The other above mentioned patent contains an operative example for making a similar food product, namely example 4. Here an alkalic solution of soya protein is interspersedly coextruded with a solution of carboxy-methyl-cellulose to which is added caramel (for sweetening and aroma). To achieve a regular structure the two solutions have the same viscosity.

The coextruded sheet formed product is collected on a conveyor film of polyester (later to be used as wrap for the product) and is solidified by rinsing a solution of NaCl - lactic acid over it. This causes the protein to coagulate.

There is also made cross-reference to my (opending, not yet published British Patent Application No. 9908444.4.

- \*) In the term "food" product, I intend to include confectionery and medical products.

The present invention concerns an improved method of bringing B into a state which is suitably firm for giving the consumer product mechanical stability, while during the coextrusion it conveniently should be in a softer state, and for the A component a contrary purpose, namely to obtain during the coextrusion a state which is firmer than the soft state which usually gives the product the best "mouth performance".

The invention is not limited to use of any particular kind of coextrusion die.

One aspect of the invention has the purpose to provide for a generally more practical method of coagulation than that described in the above mentioned example, and is characterized as stated in claim 1.

Examples of formation of a firm gel by chemical reaction between reactants in the B- and A-components: As B component colloidal solutions of demethylated pectin or alkaline soya protein or alginate acid, as reactant in the A-component ions of Ca, Mg or Al. Coagulation by change of pH can also be used, alone or in combination with the metal ions.

Or solid fine particles - e.g. fine fibres or platelets - of soya protein as a high percentage dispersion in slightly alkaline water can be coagulated with Ca-ions.

Depending on details in the parameters of the extrusion process, a B-component in form of a colloidal solution will often become molecularly oriented while it flows through the coextrusion die. This orientation can be "frozen" if the gel formation by use of a reactant from the A-component is

Compressional measurements of the resistance to deformation are commonly used in the food industry such as for firmness characterisation, for example, of gels.

sufficiently fast. The "frozen" orientation can help to make the product feel like meat when it is chewed. In the final product A may in some cases remain in the same generally plastic, gelformed or powderformed state which it had during the coextrusion, but in most cases it should preferentially be transformed to a more flowable state, especially when a juicy performance is wanted in the mouth.

When A has high contents of water, there are two ways of making A adequately semisolid to solid during the coextrusion, and later more flowable. One way - the second aspect of the invention - is by freezing and later melting an adequate part of the water as stated in claim 2, another way - the third aspect of the invention - is by use of depolymerization (hydrolyses) after the extrusion process, preferably by enzymes, as specified in claim 3. The latter applies to carbohydrates as well as proteins.

When A is in frozen or preferably part-frozen state during the extrusion, freezing of B should normally be avoided, but B should preferably prior to the extrusion be cooled down ~~almost to its freezing point and the extrusion process~~ should be carried out as fast as practically possible. The die chambers should in such cases normally be made from metal and then kept at a temperature near the freezing point of B.

Melting of a small portion of the A-layer during the passage through the die will normally be advantageous rather than harmful provided the extrusion velocity is sufficiently

high and the molten film therefore thin.

In order to keep the microcrystals bonded together to an adequate plastic consistency, there should preferably be some amounts of sugar or a watersoluble polymer (e.g. partly depolymerized protein) mixed into the A-component, and dispersed short digestible fibres are also helpful in this connection.

When leaving the die the product will normally be supplied to a conveyor belt and may be cut into suitable pieces. In all 3 aspects of the inventions, A may be sandwiched between B in 2 dimensions so that B forms one or more longitudinal channels occupied by A.

Examples of application of the invention:

- I) Confectionery or "hybride" between confectionery and healthy products, see e.g. the operational example.
- II) Meat-like foodstuff on basis of vegetable protein.
  - 1) A: a strong soup, or yoghurt with herbs and spices ("chutney"), with addition of small amounts of a thickening agent; in frozen doughlike state during the extrusion process.  

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B: a firm gel produced as stated in claim 1.
  - 2) A: during the extrusion: soya flour dispersed in water thickened by means of part-hydrolyzed soyaprotein, and with spices and other aromatic substances, plus proteinase added - after the extrusion: hydrolyzed by the proteinase.  
  
B: A non-protein gel produced as stated in claim 1.
- III) Products with contents like sausages.



A: a paste as normally used in sausages, optionally with addition of part-hydr lized soyaprot ir as a thickening agent.

B: a firm gel produced as stated in claim 1.

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Operative example.

A: honey.

B: a firm pectin gel, precipitated by chemical reaction with ions admixed to A.

Proportion between the components: A/B = 1 : 1.

B is fed in form of a viscous 5% solution in water of low-methoxy pectin of temperature 2 degr. C.

A is a honey which is in plastic state at room temperature and to which is added Ca-lactate in an amount double that which is equivalent to the pectin with which it shall react.

An ordinary flat coextrusion die is used, extruding the configuration B-A-B. The die is fed by ran extruders. The gab of the exit orifice is 3 mm. The extruded product is delivered to a conveyor belt covered by a polyethylene film. The latter is also used to wrap the product after cutting into pieces.

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A is fed at temperature -15 degr. C, and the die temperature is controlled at +2 degr. C.

The extruded product wrapped in the film is cured by storage at room temperature.

CLAIMS

1. A method of manufacturing by coextrusion a food product in sheet, ribbon or filament form, which product consists of at least two components A and B each as layers or lamellae, ~~the~~ A being in a softer and B in a firmer state, these states referring to 20 degr. C, whereby B is

sandwiched between layers or lamellae of A, and in which A is brought to coagulate to <sup>a</sup> ~~said~~ firmer state after the joining of A and B to a sandwich, characterized in that prior to joining of the components, B is in a dissolved or dispersed state capable of coagulating by a change of pH or by reaction with metal ions, and A contains dissolved substances to effect such reaction.

2. A method of manufacturing by coextrusion a food product in sheet, ribbon or filament form, which product consists of at least two components A and B each as layers or lamellae, A being in a softer and B in a firmer state, these states referring to 20 degr. C whereby B is sandwiched between layers of A, characterized in that during the extrusion A is in a firmer state suitable for the extrusion, this state being obtained by freezing.

3. A method of manufacturing by coextrusion a food product in sheet, ribbon or filament form, which product consists of at least two components A and B each as layers or lamellae, A being in a softer and B in a firmer state, these states referring to 20 degr. C whereby B is sandwiched between layers of A, characterized in that during the extrusion A is in a pre-form consisting of a suitably firm natural polymer

substance with addition of an enzyme capable of  
depolymerizing said polymer, and that subsequent to the  
extrusion said enzyme is allowed totally or partly to  
depolymerize said pre-form.

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